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SEQUENCE LISTING

<110> ENDO, Keiji et al.

<120> MUTANT ALPHA-AMYLASES

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<140> US 09/590,375

<141> 2000-06-09

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<151> 1999-06-10

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Ala Gln Leu Glu Arg Ala Ile Gly Ser Leu Lys Ser Asn Asp Ile Asn
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Val Tyr Gly Asp Val Val Met Asn His Lys Met Gly Ala Asp Phe Thr
100 105 110
Glu Ala Val Gln Ala Val Gln Val Asn Pro Thr Asn Arg Trp Gln Asp
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Ile Ser Gly Ala Tyr Thr Ile Asp Ala Trp Thr Gly Phe Asp Phe Ser
130 135 140
Gly Arg Asn Asn Ala Tyr Ser Asp Phe Lys Trp Arg Trp Phe His Phe
145 150 155 160
Asn Gly Val Asp Trp Asp Gln Arg Tyr Gln Glu Asn His Ile Phe Arg
165 170 175
Phe Ala Asn Thr Asn Trp Asn Trp Arg Val Asp Glu Glu Asn Gly Asn
180 185 190
Tyr Asp Tyr Leu Leu Gly Ser Asn Ile Asp Phe Ser His Pro Glu Val
195 200 205
Gln Asp Glu Leu Lys Asp Trp Gly Ser Trp Phe Thr Asp Glu Leu Asp
210 215 220
Leu Asp Gly Tyr Arg Leu Asp Ala Ile Lys His Ile Pro Phe Trp Tyr
225 230 235 240
Thr Ser Asp Trp Val Arg His Gln Arg Asn Glu Ala Asp Gln Asp Leu
245 250 255
Phe Val Val Gly Glu Tyr Trp Lys Asp Val Gly Ala Leu Glu Phe
260 265 270
Tyr Leu Asp Glu Met Asn Trp Glu Met Ser Leu Phe Asp Val Pro Leu

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Ser Trp Val Ala Asp Trp Phe Lys Pro	Leu Ala Tyr Ala Thr Ile Leu				
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Ile Pro Asn Asp Asn Ile Ser Ala Lys Lys	Asp Met Ile Asp Glu Leu				
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Leu Asp Ala Arg Gln Asn Tyr Ala Tyr	Gly Thr Gln His Asp Tyr Phe				
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His Phe Asp Gly Thr Asp Trp Asp Gln Ser	Arg Gln Leu Gln Asn Lys				
	165	170	175		
Ile Tyr Lys Phe Arg Gly Thr Gly Lys Ala	Trp Asp Trp Glu Val Asp				
	180	185	190		

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 Asp His Pro Glu Val Ile Asn Glu Leu Arg Asn Trp Gly Val Trp Tyr
 210 215 220
 Thr Asn Thr Leu Asn Leu Asp Gly Phe Arg Ile Asp Ala Val Lys His
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 Ile Lys Tyr Ser Tyr Thr Arg Asp Trp Leu Thr His Val Arg Asn Thr
 245 250 255
 Thr Gly Lys Pro Met Phe Ala Val Ala Glu Phe Trp Lys Asn Asp Leu
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 Ala Ala Ile Glu Asn Tyr Leu Asn Lys Thr Ser Trp Asn His Ser Val
 275 280 285
 Phe Asp Val Pro Leu His Tyr Asn Leu Tyr Asn Ala Ser Asn Ser Gly
 290 295 300
 Gly Tyr Phe Asp Met Arg Asn Ile Leu Asn Gly Ser Val Val Gln Lys
 305 310 315 320
 His Pro Ile His Ala Val Thr Phe Val Asp Asn His Asp Ser Gln Pro
 325 330 335
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 340 345 350
 Tyr Ala Leu Ile Leu Thr Arg Glu Gln Gly Tyr Pro Ser Val Phe Tyr
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 Lys Ile Asp Pro Leu Leu Gln Ala Arg Gln Thr Tyr Ala Tyr Gly Thr
 385 390 395 400
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 405 410 415
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 Gly Pro Gly Gly Asn Lys Trp Met Tyr Val Gly Lys His Lys Ala Gly
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 Gln Val Trp Arg Asp Ile Thr Gly Asn Arg Ser Gly Thr Val Thr Ile
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ttatgatata tgtaagcggt atcattaaaa ggaggtatatt g atg aga aga tgg gta 176
Met Arg Arg Trp Val
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Val Ala Met Leu Ala Val Leu Phe Leu Phe Pro Ser Val Val Val Ala
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1 5 10 15

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Asn Asp Gly Gln His Trp Asn Arg Leu His Asp Asp Ala Ala Ala Leu
20 25 30

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Ser Asp Ala Gly Ile Thr Ala Ile Trp Ile Pro Pro Ala Tyr Lys Gly
35 40 45

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Asn Ser Gln Ala Asp Val Gly Tyr Gly Ala Tyr Asp Leu Tyr Asp Leu
50 55 60

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Gly Glu Phe Asn Gln Lys Gly Thr Val Arg Thr Lys Tyr Gly Thr Lys
65 70 75 80

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Ala Gln Leu Glu Arg Ala Ile Gly Ser Leu Lys Ser Asn Asp Ile Asn
85 90 95

gta tac gga gat gtc gtg atg aat cat aaa atg gga gct gat ttt acg 560
Val Tyr Gly Asp Val Val Met Asn His Lys Met Gly Ala Asp Phe Thr
100 105 110

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Glu Ala Val Gln Ala Val Gln Val Asn Pro Thr Asn Arg Trp Gln Asp
115 120 125

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Ile Ser Gly Ala Tyr Thr Ile Asp Ala Trp Thr Gly Phe Asp Phe Ser
130 135 140

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Gly Arg Asn Asn Ala Tyr Ser Asp Phe Lys Trp Arg Trp Phe His Phe
145 150 155 160

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165 170 175

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Tyr Asp Tyr Leu Leu Gly Ser Asn Ile Asp Phe Ser His Pro Glu Val	
195 200 205	
caa gat gag ttg aag gat tgg ggt agc tgg ttt acc gat gag tta gat	896
Gln Asp Glu Leu Lys Asp Trp Gly Ser Trp Phe Thr Asp Glu Leu Asp	
210 215 220	
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Thr Ser Asp Trp Val Arg His Gln Arg Asn Glu Ala Asp Gln Asp Leu	
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Leu Thr Gly Asn Asn Gly Ala Ser Val Thr Ile Asn Gly Asp Gly Trp	
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Gln Glu Glu Leu Lys Asp Trp Gly Ser Trp Phe Thr Asp Glu Leu Asp	

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260	265	270
Tyr Leu Asp Glu Met Asn	Trp Glu Met Ser Leu Phe	Asp Val Pro Leu
275	280	285
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Lys Trp Met Tyr Val Gly	Gln Gln His Ala Gly Gln	Thr Trp Thr Asp
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Leu Thr Gly Asn His Ala	Ala Ser Val Thr Ile Asn	Gly Asp Gly Trp
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Pro Asn Ser Gly Leu Ala Thr Ile Met Ser Asn Gly Pro Gly Gly Ser	
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